

Your Detention Basin is the Linebacker You Need to Sign to a Long Term Contract



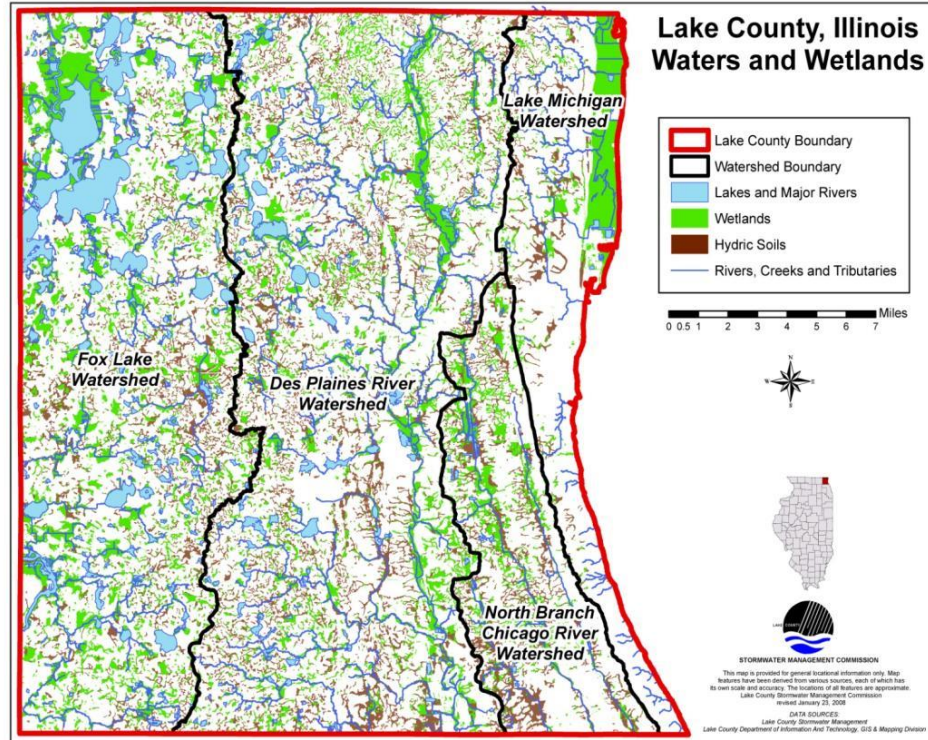
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Darren Olson, PE, D.WRE, CPESC

Scott Griffith, PE, CPESC

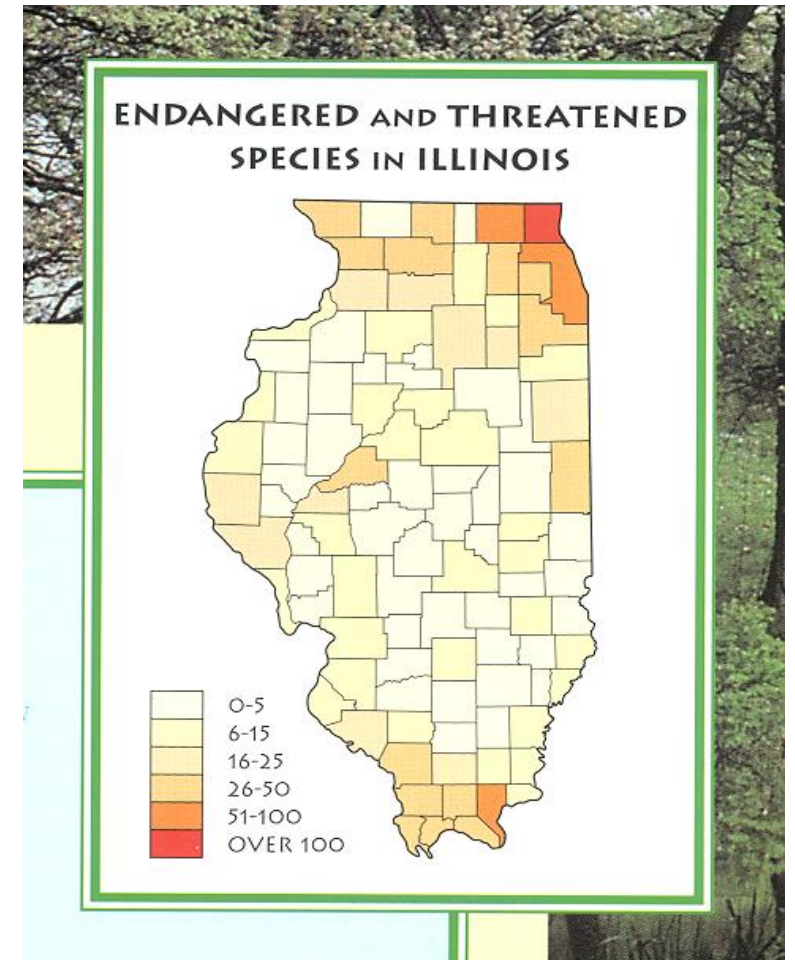


There's a Lot at Risk....



This water provides habitat for the highest number of State-threatened & endangered species in IL (140)

From: IDNR, October 2014



From: *An Atlas of Biodiversity*, Chicago Wilderness, 2001

~61,500 acres of waters and wetlands
(~21% of County is wet).

...and remember the DECI is the Site SE/SC Quarterback



Good: Proactive, Knowledge,
Experience, Communication,
Coordination



Bad: Reactionary, Poor
Communication, Unorganized, etc.

In addition to knowledge and experience, good communication and coordination skills are critical for a DECI!

Your Detention Basin Plays Many Defensive Roles – Like the Franchise Linebacker

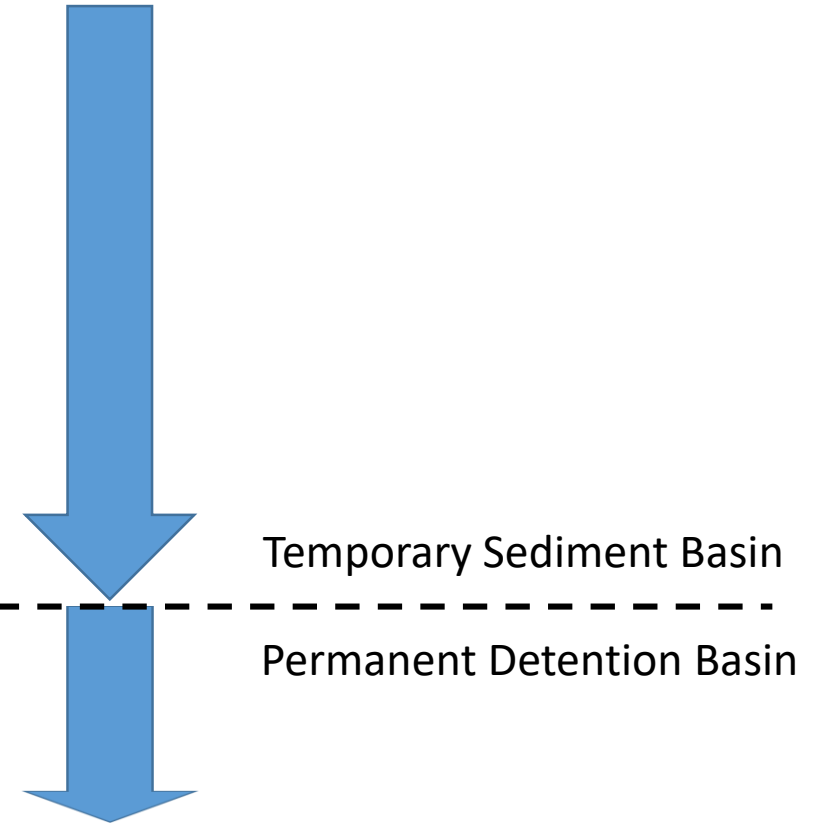
- Stormwater Detention
- Depressional Compensatory Storage
- Water quality treatment
- Native vegetation
- Habitat Benefits
- Sediment Basin During Construction
 - Last stop on the construction BMP treatment train
 - Flocculant settling basin
 - Impacts on future detention basin functionality



“feed me a Packer”

The Career of your Detention Basin*

- Scouting at The Combine
- Draft Day
- Pre-Season
- Regular Season
- Injured Reserve
- Long Term Injured Reserve
- Rehab and Returning to Action
- Signing a Long Term Deal



*Need to think long-term, don't throw away your first round draft pick on something unproven or mediocre....

Scouting at the Combine – Planning and Design

- Wetland, Wet or Dry Bottom Design
 - Site Constraints
 - Recreational uses
 - Water quality permitting impacts
 - Hydrocarbon removal
 - Will affect how basin functions during construction
- Detention Basin Design
 - 100-year release rate = 0.15 cfs/acre of disturbed area
 - Can be sized with hydrologic models or nomographs
 - Other volume requirements: 2-year volume, WQ, depressional storage
 - Several other requirements for safety & access, overflow, etc.
 - New rainfall standards – detention basins may be getting bigger!

Scouting at the Combine – Planning and Design

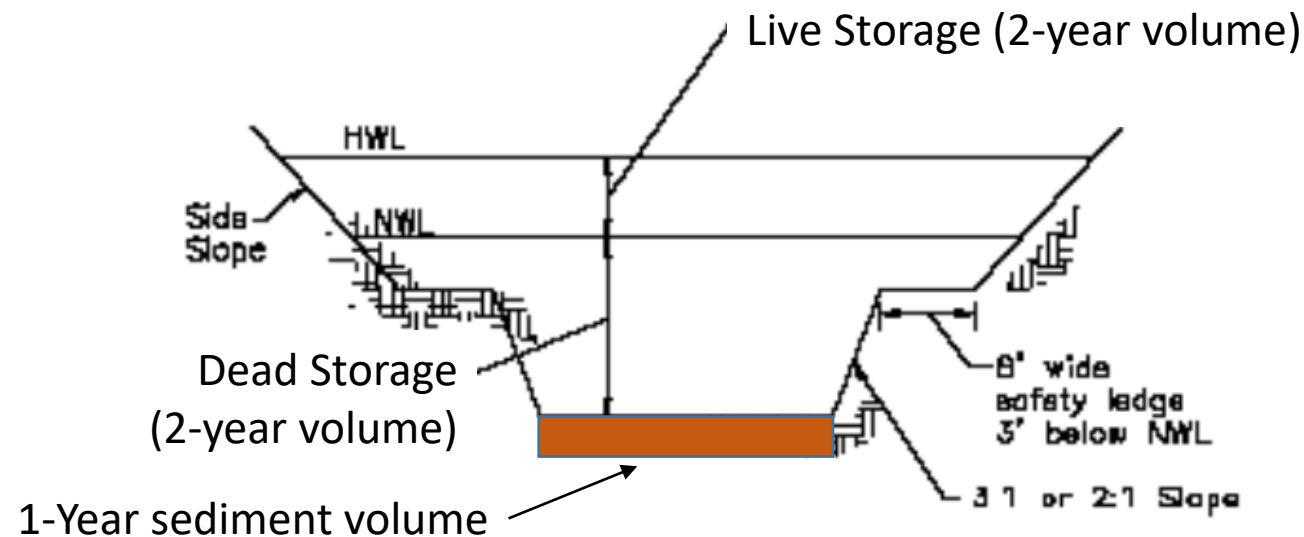
- Per the WDO, Sediment Basin is required for land disturbance greater than 5 acres
- A properly designed and maintained sediment basin will allow settling of 70-80% of courser (sand, heavy silts) from suspension



- Will you use your future detention basin as your temporary sediment basin during construction?

Scouting at the Combine – Planning and Design

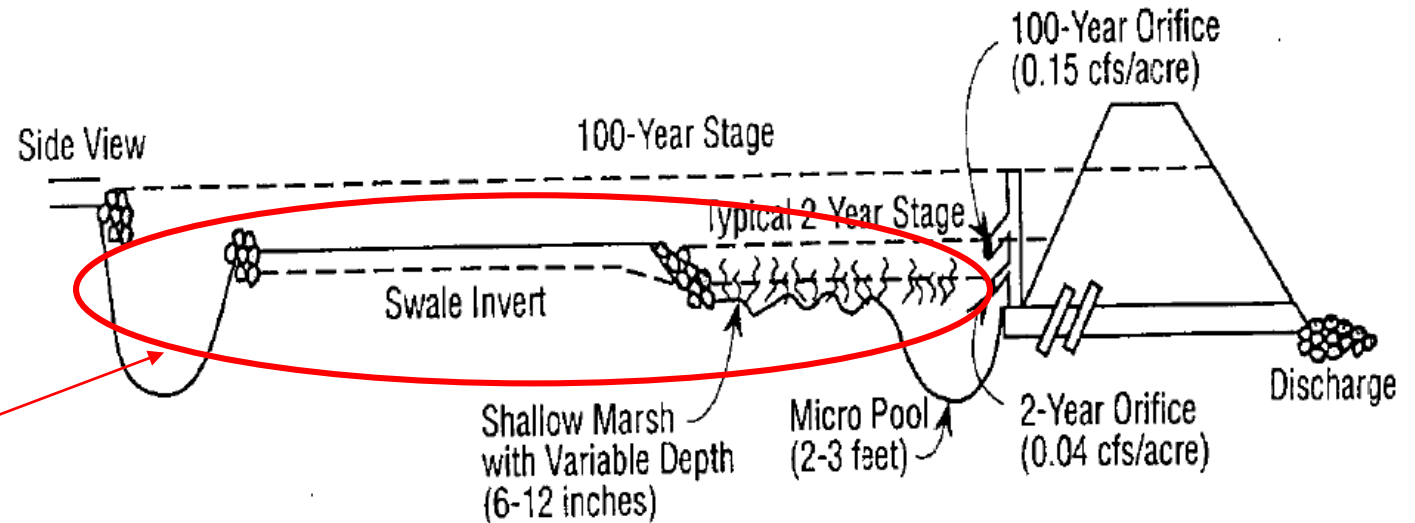
- Sediment Basin Volume Requirements
 - 2-Year Volume of Live and Dead Storage
 - 1-year sediment load
 - Detention basin must keep volumes above during construction



- What if your sediment basin drains to an “impaired water*”??

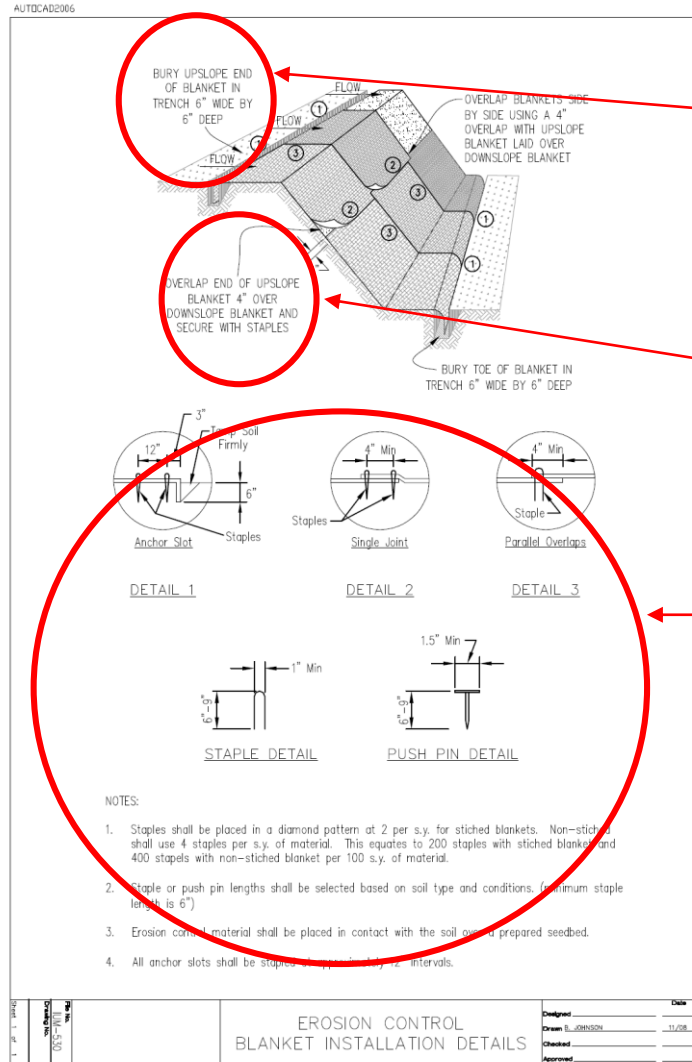
Scouting at the Combine – Planning and Design

- How will your future detention basin handle sedimentation?
 - Wet Basin
 - Over-excavate
 - Dredge after construction
 - Dry Basin
 - Over-excavate
 - Excavate after construction
 - Wetland Basin
 - Likely insufficient sediment volume
 - Over-excavate?
 - Dredge after construction?
 - Seeding vs. plugs?



Draft Day – Get the Details Right!

Illinois Urban Manual Erosion Control Blanket Detail (IUM-530)



Key blanket in on top of slope – 6 inches

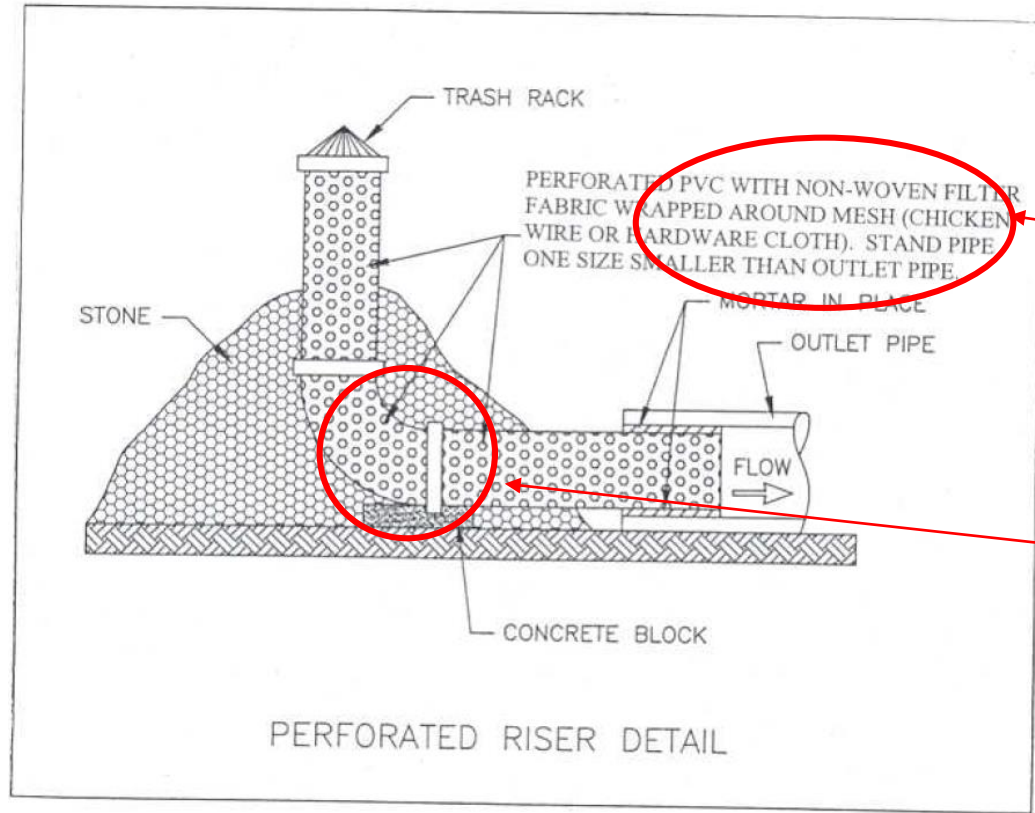
Overlap blankets 4 inches

Min staple length = 6 inches
2- 4 staples/yd² depending on stitched vs. non-stitched blanket

Install as slopes are being graded – don't wait!

Draft Day – Get the Details Right!

Lake County SMC Perforated Riser Pipe Detail



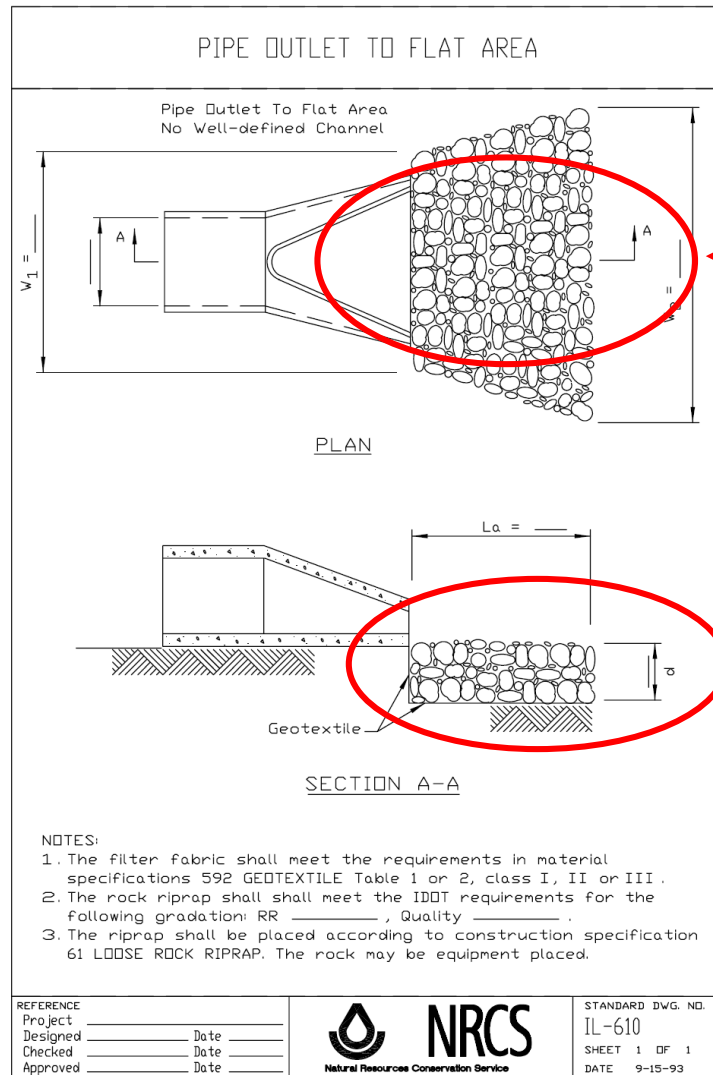
Use chicken wire under non-woven filter fabric, will prevent frequent clogging of holes

Make sure holes go all the way down the elbow

Frequent maintenance may be required – inspect often!

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Draft Day – Get the Details Right!



Illinois Urban Manual Riprap Detail (IUM 610)

- For 12-inch Pipe:
- **Minimum** apron length = 10 ft with RR-3 (5-inch d50)
- Note: as pipe size increases, so does apron length and stone size
- See table in IUM

- Critical that riprap is below surrounding ground, not mounded up
- Depth of stone increases with pipe size increase

Pre-Season!...Time to Study the Playbook

Prior to the start of construction activities:

- Review sediment basin plans and schedule with all parties
- When should sediment basin be constructed?
 - A. Anytime before the first home is built
 - B. Right before Tim or Mea come to visit the site
 - C. When you need the excavation to balance your site
 - D. After tree clearing but before stripping the site

Pre-Season!...Time to Study the Playbook



STORMWATER MANAGEMENT COMMISSION

TYPICAL CONSTRUCTION SEQUENCING

- 1.) Installation of soil erosion and sediment control SE/SC measures
 - a.) Selective vegetation removal for silt fence installation
 - b.) Silt fence installation
 - c.) Construction fencing around areas not to be disturbed
 - d.) Stabilized construction entrance
- 2.) Tree removal where necessary (clear & grub)
- 3.) Construct sediment trapping devices (sediment traps, basins...)
- 4.) Construct detention facilities and outlet control structure with restrictor & temporary perforated riser
- 5.) Strip topsoil, stockpile topsoil and grade site

Pre-Season!...Time to Study the Playbook

Prior to the start of construction activities:

- Your Sediment Basin is what you think it is!....but remember
 - Not a magic bullet
 - Not a green light to leave site disturbed
 - Will not remove all sediment
 - It is likely your future detention basin
 - You will have to repair damage to it and bring it up to permit conditions
 - Like a linebacker, part of a team
- Talk temporary stabilization at your pre-con!
 - Erosion from construction sites range 30-200 ton/ac/year*
 - What is that doing to your future detention basin?

What can we learn from Dennis Green about this?*



OCTOBER 16, 2006

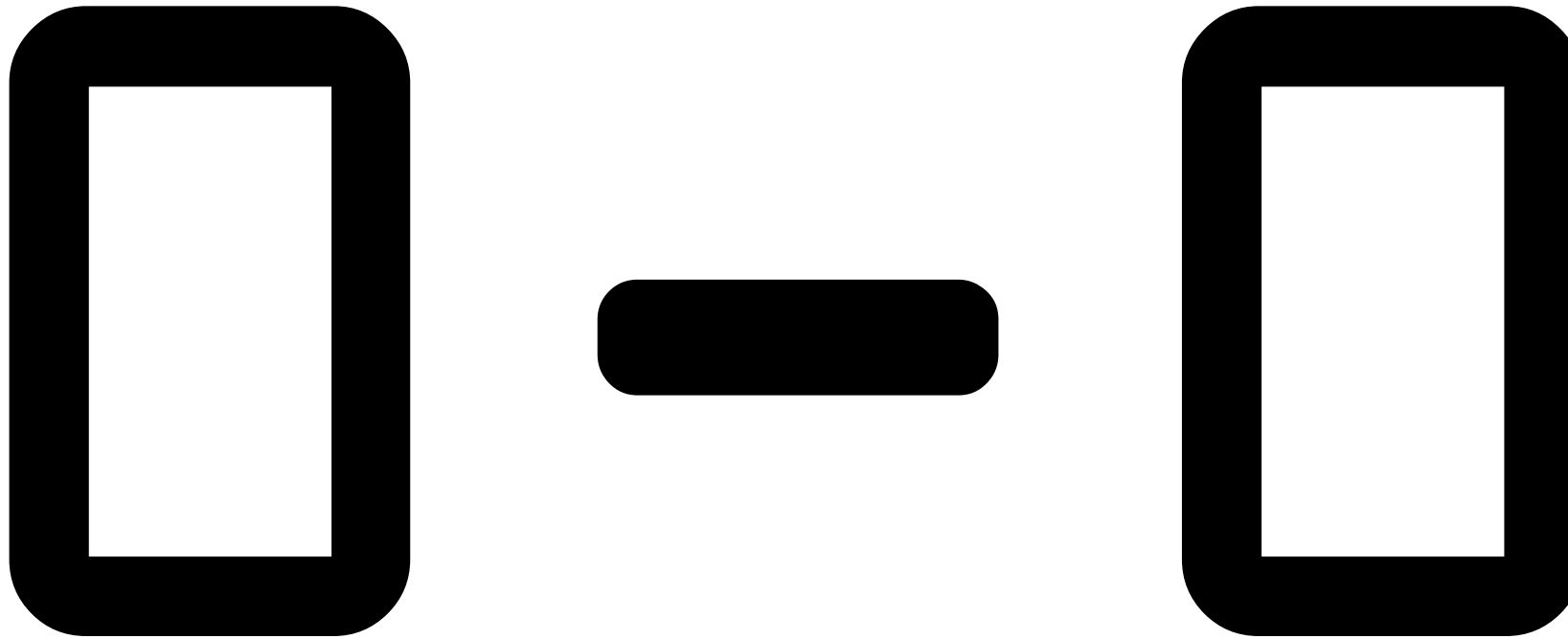
"They are who we thought they were!" - Arizona Cardinals coach Dennis Green after the team's 24-23 loss to the Chicago Bears on Monday Night Football.

*Brian Urlacher recorded 19 tackles and a forced fumble that was returned for a touchdown

Christopher B. Burke Engineering, Ltd.



Regular Season



Regular Season



- Riser Pipe Installation
 - Stabilizing Stone, if used, can't go up the riser pipe
 - Often results in an increased NWL
 - Emergency Overflow set at 2-year, 24-hour volume.
 - Often just “cowboyed in the field”
 - Incorrect fabric used
 - Monofilament is preferred

Regular Season

- Properly designed and maintained sediment basin is expected to allow 70% - 80% settling of coarse sediment
- How do we get rid of the fine silt and clay particles?
 - Larger Forebay
 - Use of polymers
 - Baffles
 - Additional stabilization of tributary areas
 - Treatment train methodology

Regular Season



Regular Season



Injured Reserve



Injured Reserve

- Repairs and Maintenance Needed
 - Causes
 - Large Rainfall Event
 - Failed SE/SC Measures
 - Results
 - Silt Fence Undermined
 - Sediment Flows Into Ponds
 - Vegetation Doesn't Establish

Injured Reserve



Injured Reserve



Injured Reserve



Injured Reserve

- Common Causes
 - Incorrect installation
 - Silt fence doesn't meet SMC specifications
 - Not trenched in properly
 - Gaps under silt fence
 - Large tributary area
 - Disturbed area not stabilized
 - No additional stabilization measures used

Injured Reserve



- What's the big deal?
- Basin is holding sediment..

Injured Reserve

- Loss of storage volume
 - Doesn't meet WDO requirement
 - Will require additional excavation(\$\$)
 - Native Plants (\$\$)
- Impact Perforated Riser Pipe
 - Will require Maintenance
 - Impact water level in basin



Long Term Injured Reserve



Long Term Injured Reserve

- Long Term Site Inactivity
 - Project become dormant
 - Developer goes out of business
 - Home sales slow
 - SE/SC is neglected
 - Temporary stabilization not achieved
 - What happens to the basin??

Long Term Injured Reserve



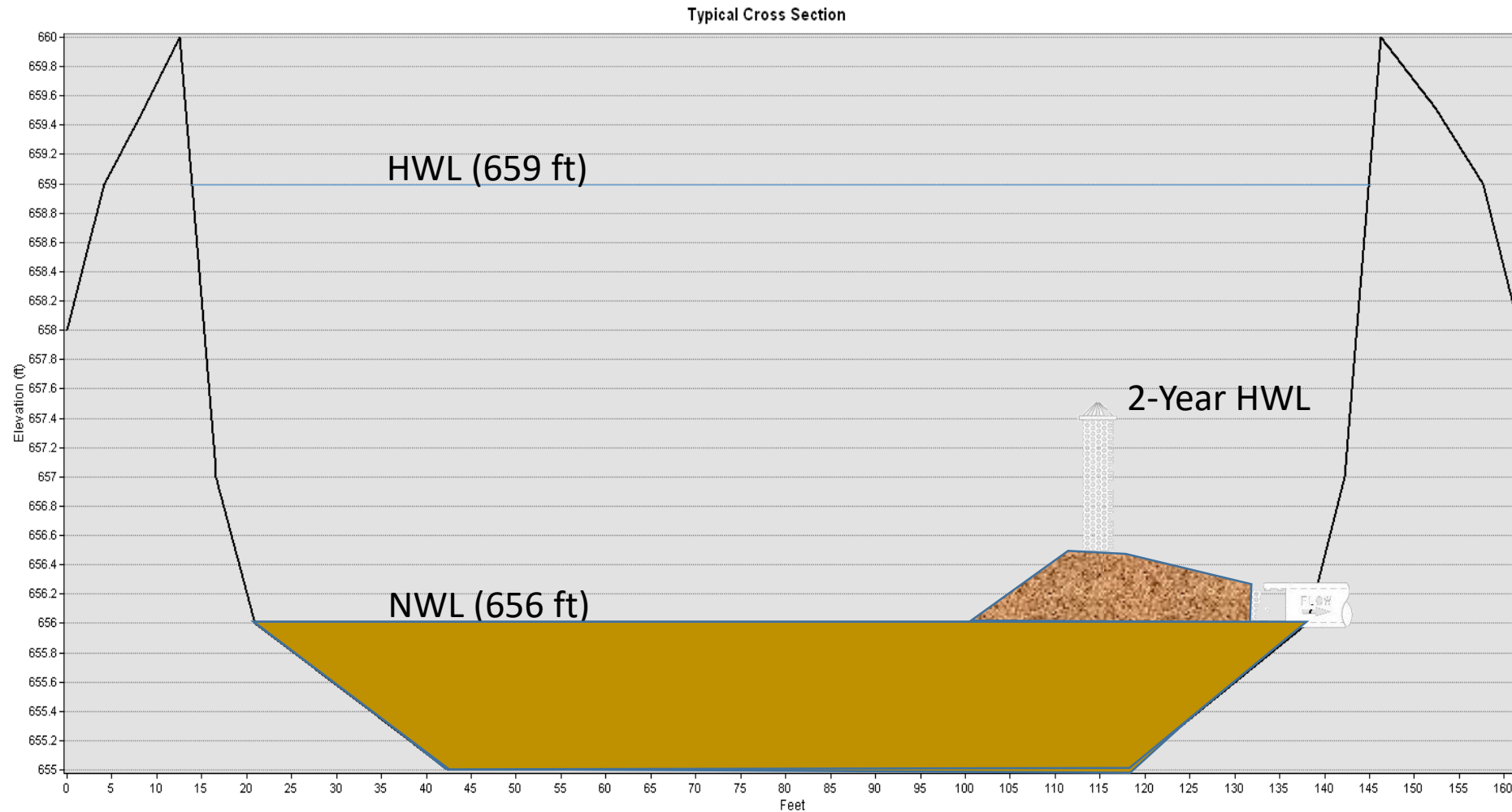
Long Term Injured Reserve



Long Term Injured Reserve



Long Term Injured Reserve



- After Construction of Sediment Basin
 - Water quality constructed below the normal water level
 - Design Volume Provided
 - Example
 - Water Quality Volume
 - Water Quality Volume
 - 0.0 ac-ft
 - 0.34 ac-ft
 - Live Storage
 - 1.96 ac-ft
 - Live Storage
 - 1.96 ac-ft
 - 100% loss in water quality

Rehab and Returning to the Field



Rehab and Returning to the Field



Rehab and Returning to the Field



Rehab and Returning to the Field



Blocked flared end section



Rehab and Returning to the Field



Increase water surface elevation impacts plantings

Rehab and Returning to the Field



and plugs.



Rehab and Returning to the Field



Proper riprap installation for energy dissipation



Signing a Long Term Deal



Signing a Long Term Deal

- Project is Complete
 - Submit As-Built Survey for Approval
 - Volume above and below NWL (water quality, 2-year, 100-year)
 - Top of berm and emergency overflow
 - Site is stabilized
 - Vegetative Cover (native)
 - SE/SC measures fully removed
 - Deed and Plat Restrictions over stormwater management system
 - Clear ownership responsibility
 - Reference maintenance plan

Signing a Long Term Deal



BLOCKED RESTRICTOR

Keep the restrictor clear of debris



FULL FLOW

Signing a Long Term Deal



Keep the restrictor clear of debris



Signing a Long Term Deal

Keys to Successful Long Term Maintenance

- Basin becomes the responsibility of the owners association
- Sign a contract with a landscape company familiar with maintenance tasks:
 - Removing obstructions from the outlet control structure
 - Do not mow the buffer
 - Do not weed, re-seed or sod the buffer
 - Do not dump yard waste in the buffer
 - Understanding of what plantings work and when to install

Signing a Long Term Deal



Wishing Your Detention Basin a Happy and Profitable Retirement



Questions?

Christopher B. Burke Engineering, Ltd.

